

Product Innovation And Measuring Its Effectiveness

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Abstract: Survival of a company is dependent on the importance it assigns to change. Innovation is a key to change. There are different types of innovation. The most significant is product innovation. A company should strive to achieve the best in its field. Speed, market orientation and flexibility are the three factors which accelerate this type of innovation leading to creation of market value.

Keywords: Product Innovation, Innovation Speed, Innovation Types.

Innovation is key to growth and competitiveness in the modern economy. The benefits of innovation to companies at the corporate level and economy at the national level are irrefutable. From a firm's perspective, innovation leads to new products, processes and services, which allow a firm to reduce its production costs, access new markets or develop new ways of doing things (Sena 2004). Much of the misunderstanding and conflict surrounding innovation adoption is owed to a long standing uni dimensional concept of innovation. If innovations were either/or in terms of their dimensionality, as some have proposed, extant models of innovation adoption and management would be sufficient in most situations (Cooper 1998). Even Adam Smith, in his classical economic thought, allied an understanding of the importance of the fundamental process of technological change with a wealth of observational detail reflecting the institutional and industrial organisation of the time (Love 2002).

Importance of having all stakeholders involved with improvement initiatives such an organizational culture of involvement of different stakeholders, a fundamental element for continuous innovation and improvement, reinforces the social capital of the cluster, which in turn is a fundamental element for cooperating, innovating and promoting actions to improve the collective efficiency of the cluster (Carpinetti 2007). According to Loewe (2001), companies have numerous successful new strategies to innovate more effectively than others. One thing is common among all successful innovators is that they have big aspirations, a flexible definition of their business, and a habit of experimentation.

This literature review includes evidence that competitive success is dependent upon an organization's management of the innovation process and proposes factors that relate to successful management of the product innovation process.

According to Fuchs (2011) there are strong arguments indicating that customer empowerment in new product development enables firms to develop better products and at the same time to reduce costs and risks if customers in a given domain are willing and able to deliver valuable input. Environmental dynamism is a greater predictor of radical innovations than of incremental ones. Radical innovation usually requires a vast amount of resources, high R&D intensity might indicate the ability of the firm to make radical innovations. This is true especially for small start-up firms. On the other hand, because of small risks and high potential volumes, a lot of time and money is often allocated to creating incremental innovations, particularly in large incumbents with larger resources (Laukkanen 2008). A central prerequisite for profiting from innovation, regardless of whether it is radical or incremental, is that the innovating company is able to prevent, or at least delay, the duplication of its essential intellectual assets and technology. If competitors have a chance to seize, copy, and exploit knowledge and product- and process-related information with little or no costs, it will be difficult for the firm to get returns on the investments in innovation. Therefore, it is important for the company to know how to capture and take hold of intellectual assets and their value. As per Laukkaen 2008, in the present day market where knowledge and information diffuses rapidly, companies need a

strong appropriability regime in order to profit from their innovations.

Over the years of product innovation research, much attention has been given to process and structure models, and then, mainly contextualised in consumer goods. Yet one of marketing's hardy (but often dismissed) perennials, the Product Life Cycle, illustrates the way in which incremental innovation prolongs product life up to the point where a radical innovation changes both market and management rules in fundamental ways, leaving the former product attributes and methods of managing them redundant (Story 2009). Process of bringing a radical innovation from idea to eventual market launch requires four competences: discovery, incubation, acceleration and commercialisation. Market orientation appears to be a key mechanism by which firms can reap the benefits of their innovation capabilities without incurring the costs associated with potential rigidities (Gima 2005).

It is most appropriate and beneficial to treat innovation as a phenomenon that consists of multiple dimensions at the same time (Cooper 1998). He continues that dimensions of innovation can be added to and amended as appropriate.

Product innovation has been largely studied from the point of view of process models that attempt to distil the essence of the activities needed to bring a new product from inception to market launch (Story, Hart, & O' Malley, 2009). Technologies and customers are firm competences that can be leveraged to build new firm competencies (Danneels, 2002). In order to have product innovation, companies should have technical competence, integration competence and market knowledge competence (Sheperd & Ahmed, 2000). Responsiveness to market intelligence improves innovation speed (Carbonell & Escudero, 2010). The faster the response, greater is the innovation speed. It has been researched that efficiency and efficacy are the dimensions of product innovation (Alegre, Chiva, & Lapidra, 2006). Innovation speed plays an important role directly and indirectly, through the creation of positions of advantage, in enhancing new product performance (Carbonell & Rodriguez, 2006). Proactive market orientation and responsive market orientation have a positive total effect in improving product innovation performance (Zhang & Duan, 2010). In their study Espallardo & Ballester (2009) found that product innovation is found to be effective in influencing performance in firms with higher pressure from the five competitive forces, whereas no significant influence is found in firms in less hostile environments. If technology capable firms develop strategic flexibility in their resource allocation and coordination, they shall be more innovative (Zhou & Wu, 2010). A high perceived reputation for product innovation shall not result in premium on prices even though there would be a higher loyalty towards the firm (Henard & Dacin, 2010). To realize radical product innovation, firms tend to focus on processes and knowledge areas outside the traditional scope of marketing management (Tollin, 2008). The moderating effect of resource flexibility on the positive relationship between product innovation and firm performance is negative, while that of coordination flexibility is positive (Li, Su, & Liu, 2010). Systematic orientation of business actions towards expectations of new customers leads to development of innovation (Herrmann, Tomczak, & Befurt, 2006). Use of ICT

raises the level of innovation within a company through the development of new products that are adapted to market needs, and reduce technological, strategic and marketing risk (Requena, Sellens, & Zarco, 2007).

Source	Research Method	Findings
(Corso & Pavesi, 2000)	Case Study	Performance is determined by systems behaviour of individuals and groups
(Story, Hart, & O' Malley, 2009)	Interviews	Discovery, incubation, acceleration and commercialization are important competencies for success of radical product innovation.
(Danneels, 2002)	Interviews	Product innovation activities lead to development of firm competencies. Technologies and customers are firm's competencies.
(Carbonell & Escudero, 2010)	SEM and Post Hoc	Responsiveness to market intelligence improves innovation speed. Innovation speed partially mediates the relationship between market orientation and new product performance.
(Alegre, Chiva, & Lapidra, 2006)	SEM	Product Innovation is dependent on efficiency and efficacy of the firm.
(Zhang & Duan, 2010)	SEM and Hierarchical Regression	Proactive market orientation and responsive market orientation have a positive total effect in improving product innovation performance.
(Espallardo & Ballester, 2009)	SEM	When competitive pressure is low, SMEs should be cautious about investing in product innovation, but firms should focus on innovations based on market orientation when the competitive forces are harsher. Product innovation does not completely mediate the relationship between market orientation and performance.
(Zhou & Wu, 2010)	Hierarchical Regression	High level of technological capability impedes explorative innovation. But when strategic flexibility is high, greater technological capability is associated with more explorative innovation.
(Henard & Dacin, 2010)	Regression and Post Hoc	A high consumer perceived reputation for perceived innovation, via the involvement construct, leads

Source	Research Method	Findings
		to excitement toward and heightened loyalty to the firm. A high perceived reputation for perceived innovation does not lead to a consumer propensity to pay price premiums.
(Tollin, 2008)	Exploratory	To realize radical product innovation, firms tend to focus on processes and knowledge areas outside the traditional scope of marketing management.
(Li, Su, & Liu, 2010)	Regression	The moderating effect of resource flexibility on the positive relationship between product innovation and firm performance is negative, while that of coordination flexibility is positive.
(Herrmann, Tomczak, & Befurt, 2006)	Causal Analytic model	Willingness to abandon investments strongly determines radical product innovations. Systematic orientation of business actions towards expectations of new customers leads to development of innovation.
(Carbonell & Rodriguez, 2006)	SEM	Innovation speed plays an important role directly and indirectly, through the creation of positions of advantage, in enhancing new product performance. Innovation speed gives positional advantage and new product performance.
(Requena, Sellens, & Zarco, 2007)	CHAID analysis	Intensive ICT use in marketing makes the company more innovative, as it perceives that its usage breaks down barriers to innovation.

Table 1

Apart from product innovation, there are other types of innovations which are considered to be innovations and diffuse for adoption.

MANAGEMENT INNOVATIONS

According to Hamel (2008), Management Innovation is the invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organizational goals. The process of management innovation does not always proceed as a linear sequence of activities from motivation through to theorization and labeling. Internal change agents will typically have superior knowledge and networks inside the organization and

greater accountability for delivering results than their external counterparts.

KNOWLEDGE INNOVATION

Zhang (2010) Knowledge acquisition and knowledge creation both enhance innovative performance. Knowledge acquired from alliance partners requires further new knowledge creation to generate innovative benefits for the firm. These effects were stronger in international than domestic alliances. Knowledge acquired in international alliances is applied more to innovation than knowledge acquired in domestic alliances. Prabhu, Chandy, and Ellis (2005) describe technical knowledge depth as the amount of within-field knowledge the firm possesses. McEvily and Chakravarthy (2002) also argue that complex knowledge reflects the degree to which knowledge consists of many different, unique, and interdependent elements, such that knowing how one element works reveals little about how the different elements work together. De Luca (2007) states Market knowledge and cross-functional collaboration enhance product innovation performance.

R&D INNOVATION

R&D intensity is positively significant in regard to the decision to innovate, but it is not significant in terms of increasing the number of valid patents. Choi (2001) finds Innovation themes have been around for centuries, e.g., consolidation and universalization, while others, such as going virtual or immediacy are of more recent vintage. Innovation themes fall into three major patterns (a) Same theme, different industry (b) The growth curve of a strategy (c) Everything old is new again.

SERVICE INNOVATIONS

As per Möller (2008), Service innovation management is a tricky area. They have to incorporate client's experience into service innovation, and understand client's ability to capture value from the service and develop the necessary capabilities, culture, and mindset for a particular service situation. Toivonen (2009) states that service innovation is a new service or such a renewal of an existing service which is put into practice and which provides benefit to the organisation that has developed it; the benefit usually derives from the added value that the renewal provides the customers. In addition, to be an innovation the renewal must be new not only to its developer, but in a broader context, and it must involve some element that can be repeated in new situations, i.e. it must show some generalisable feature(s). A service innovation process is the process through which the renewals described are achieved. (Sundbo, 1997)

ICT IN INNOVATIONS

ICT use has brought about significant changes in organisations and produced important benefits, including in the areas of marketing and innovation (Requena, Sellens, & Zarco, 2007). Studies have also confirmed that not all

potential adopters of new technology use one information source exclusively. There are, in fact, a multitude of information sources available for farmers to utilize other than extension (Rollins 1993). Adoption of the mobile phone proceeds only partly on a functional basis. It has also been spurred by observability and imitation, by cultural and lifestyle changes, by status imitation and fashion trends, and by the sheer retail presence and dynamic product and pricing innovations of the mobile industry (Kalba 2008). As per Pederson (2002), Technology oriented or aggregate diffusion models are insufficient to explain the adoption process of mobile commerce end-user services. Applying one single or general perspective on understanding the end user is insufficient, and that a triangulation of theoretical perspectives is necessary.

A study by Gruber (2010) finds that mobile telecommunications diffusion significantly affects both GDP growth and productivity growth. Low mobile diffusion has thus a high economic cost in terms of unrealised economic growth which is the higher the lower the mobile penetration rate. To fully benefit from the adoption of mobile telecommunications, the infrastructure has to form a critical mass of lines.

FINANCIAL IMPLICATIONS

Innovations have to be financially viable. Downstream commercialization sub-process is a crucial stage, in innovation. Systematic innovation policy-making should be oriented to the ultimate goal of innovation activities, i.e., the maximization of economic profits by commercial implementation. More funding from industries (firms) will promote the innovation efficiencies, while more funding from governments will impede them (Guan 2010). The role of board of directors takes on heightened awareness for endangering an innovative perspective and perhaps a comparative reduction of the control mentality which can stifle innovation.

Lin (2010) in his study investigates the relationship between foreign direct investment, imports and exports, and product innovation. Inward FDI, outward FDI, and imports significantly affect the firms' decisions to innovate. R&D intensity is positively significant in regard to the decision to innovate, but it is not significant in terms of increasing the number of valid patents. Firm's innovative activities are primarily hampered by economic and internal factors. It further finds that external finance is statistically significant with regard to engaging in product innovation and holding effective patents in both manufacturing and service firms, indicating that it is really beneficial for innovative activities if a firm receives an outside subsidy, either from the government or from other institutes.

MEASURING INNOVATION

Quantifying, evaluating and benchmarking innovation competence and practice is a significant and complex issue for many contemporary organizations (Frenkel et al. 2000). An important challenge is to measure the complex processes that influence the organization's innovation capability, in order

that they can be optimally managed (Cordero 1990). The measurement of innovation is also important from an academic research perspective. Unless constructs relating to the phenomenon are measurable using commonly accepted methods, there is a risk that different operationalizations of the same effect will produce conflicting findings, and that theoretical advances become lost in the different terminologies that resist the accumulation of knowledge (Adams et al 2006). As per Adams, innovation can be measured in terms of inputs, knowledge management, innovation strategy, organisation & culture, portfolio management, project management and commercialisation. Innovation ambidexterity enables a firm to move quickly toward new market opportunities and to exploit and improve the value of current product services while taking the costs out of existing operations (Mathew 2010).

Cormican and O'Sullivan (2004) defined five key factors that facilitate product innovation management: strategy and leadership, culture and climate, planning and selection, structure and performance, communication and collaboration. Hollanders and Celikel-Esser (2007) argued that although innovation is not a linear process where inputs automatically transfer into outputs, it is worthwhile to examine differences in efficiency by assuming that efficiency can be defined as the ratio of innovation outputs over inputs.

There are a number of metrics that are commonly used for measuring innovations (Tin 2005).

Revenue growth from new products: Most widely used metric by the leading firms. It is based on strategic targets set by the business and an understanding of how the company can achieve its growth targets (the Innovation Gap).

Patent submission: An increasingly popular approach that is widely abused by many firms outside of the high tech and pharmaceutical industries. Patents are only one form of protectable intellectual property and many firms focus more on the legal aspects of protection than the business upside.

Idea submission and flow: The ideas flowing through an idea management system provide a visible reference point to the volume and quality of submissions.

Innovation capacity: Companies measure innovation capacity using survey tools such as KEYS, the Innovation Climate Questionnaire or other tools and use the information on a 12- to 24-month basis to determine whether the company has become more innovative.

The construct research and development (R&D) intensity has frequently been used as a global measure of input. Typically, it is expressed as a ratio between expenditure (e.g. Parthasarthy and Hammond 2002) or numbers employed in R&D roles (Kivimäki et al. 2000).

As per Tin (2005), the measurement tools can be Index of corporate innovation and balanced scorecard. The performance metrics are Return on Investment, cumulative profits/revenues, growth impact, new product survival rate (Kuczmarski 2000).

Customer Wealth: Another way to measure this could be the test the perceived benefits that accrue to the end user. If the use of innovative product increases the consumption whether conspicuous or status and improves the perception of well being then it has created wealth to him. This can be a descriptive study measuring such constructs like perceived

economic well being and consumption. This is not a often used method to measure innovation and still in stages of infancy.

CONCLUSION

It may be summarised that market share is dependent on innovation but it is a means and not an end in itself, as innovation ever ends. It is fact that companies which have innovated have fared better than those who have done nothing. However the buck doesn't stop with innovation. Product innovation at times may not be easy to implement whereas process innovation would be simpler. Innovation can adopted if there is speed in responding to the needs of the customers and market orientation approach of an organization exists. The firm should be flexible in its approach and coordination exists amongst its different departments. However very little has been done to measure innovation from a customer's perspective. Success of a product innovation may be judged by the way it benefits the end consumer and creates wealth for him.

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